Status of the Claims

Claim 1 has been amended to more clearly define the invention and obviate the claim objections and the rejection under 35 U.S.C. § 112 and should be allowable. Claims 2, 5 and 12 have been canceled. Claims 3 and 6 have been amended and each is now dependent on Claim 1. Claims 4, 7, 8 and 10 are original claims. Claim 9 has been amended to obviate the claim objections and the '112 rejection. Claim 11 has been amended as suggested by the Examiner to avoid the claim objection.

Restriction Requirement

A restriction requirement was made by the Examiner under 35 U.S.C. 121. Applicants elect to prosecute Claims 1-11. Claim 12 has been canceled but Applicants reserve the right to file a divisional application at a later date directed to the subject matter of Claim 12.

Claim Objections

Claims 1 and 11 were amended as suggested in the office action by the Examiner and the amendments should obviate the rejections of these claims.

Claim 9 was amended and made an independent claim wherein curing is accomplished by a combination of NIR and UV radiation and this amendment should obviate the objections raised by the Examiner.

Rejections – 35 USC § 112

Claims 1-11 were rejection under 35 USC § 112 as failing to comply with the enablement requirements of the first paragraph of '112. In particular, an objection was raised to the heating rate of the energy absorbing material and the intensity of the NIR heaters (Claim 8). The disclosure in the specification is quite clear to any person skilled in the art. The total radiation period is from 0.5 to 60 seconds (see specification page 5, lines 18-19) and in Example 3, NIR radiation was 6 seconds (see page 8, line 5). In general, the curing temperatures of the powder coating composition are between 120 and 300°C.

In reference to Claim 8 which recites that the NIR radiation is provided with an intensity of more than 1/W/cm^2, one skilled in the art recognizes that NIR lamps are

provided with limited output. Attached is a brochure from Heraeus, one of the key suppliers of IR heaters showing the heaters listed have a maximum power output of 1MW per square meter which is 10 W/cm^2. One skilled in the art would not have a problem finding and using an appropriate IR heater to provide NIR radiation to provide the desired degree of heating to cure the coating composition of the invention.

The whole concept of the invention is to provide short curing times to provide excellent adhesion of the coating to the substrate and provide a coating with a good appearance. The rapid response NIR heaters, preferably in the 800-1200 nm range provide for this.

In regard to the '112 rejection under paragraph 2 of Claim 1, the particular materials used in step (a) of Applicants' process have been set forth in the amended Claim 1 and these materials do form coatings with the heating rates set forth in the claims. The amendment should obviate this rejection.

The above explanation and amendments to the claims should obviate the '112 rejections of the office action.

Claim Rejections – 35 USC § 103

Obviousness Rejection over Blatter et al.

Claims 1 and 7-11 were rejected under 35 U.S.C. 103 (a) as being unpatentable over Blatter et al. (WO 99/41323). The Examiner cited US 6,406,757 as being from the same patent family. Applicants will refer to the US patent in the following discussion.

There is no disclosure or suggestion in Blatter that would lead one to apply a first layer of a material that is either carbon, graphite, magnetite, iron oxide black, tin oxide or antimony oxide as has been set forth in the amended claims. These materials as an applied first layer on a substrate are not taught nor is the concept of applying a first layer suggested by Blatter.

The Examiner's suggestion that the conductive primer shown in the specification on page 2, line 10 can be the applied material of first step of Applicants' process is totally incorrect. The materials as now claimed do have the specific heating rate and high energy radiation absorption rate as set forth in the claims.

Some reference must be cited by the Examiner to support her position that any material has the high energy absorption rate and heating rate as set forth in the claims.

The Examiner's attention is called to Table 1 on page 8 of the specification. The powder coating compositions prepared in Examples 1 and 2 were applied to two separate aluminum substrates, one did not have a carbon coating layer and the second did have a carbon coating layer on the aluminum substrate and is representative of the invention. As shown by the data, adhesiveness, flow, impact resistance and flexibility of the cured powder coating on the aluminum panel having the carbon layer were superior to the cured powder coating on the aluminum panel that did not have the carbon layer. Further, the curing time using NIR radiation was more than double for the panel without the carbon layer. This experiment clearly shows that physical properties and curing times of powder coatings applied according to the process of Applicants' invention are superior to those applied by prior techniques such as those taught by Blatter.

Since the application of a first layer to a substrate and the particular components of the first layer as set forth in the amended claims are not mentioned or suggested by Blatter, the obviousness rejection based solely on Blatter can not stand and should be withdrawn.

In regard to the obviousness rejection of Claim 9 in view of Blatter, the same arguments made above apply for the first layer applied to the substrate and in regard to the use of UV radiation in combination with NIR radiation to cure the coating, Blatter clearly states that the use of UV radiation to cure thick coatings is problematic (see Blatter, col. 1, lines 41-44). Blatter does teach the use of NIR radiation with a conventional heat source (see Blatter, col. 5, lines 22-25) but not the combination of NIR radiation and UV radiation as set forth in amended Claim 9. The obviousness rejection of Claim 9 based on Blatter must be withdrawn.

The Examiner's comment in regard to Claim 11 are not understood since Claim 11 was not part of the election requirement and the substrate was not an issue.

Obviousness Rejection over Blatter et al. and Nickerson

Claims 1 and 7-11 were rejected under 35 U.S.C. 103 (a) as being unpatentable over Blatter et al., supra, further in view of Nickerson (US 3,860,506).

The same comments and arguments in regard to Blatter also apply to this rejection and will not be repeated. Nickerson is directed to the application of a graphite coating to a substrate to make the substrate electrically conductive and the graphite coated substrate is then electrocoated with a coating composition which is NOT a powder coating composition. Nickerson is directed to a completely unrelated technology. Nickerson is directed to coating non-metallic porous substrates that need to be made electrically conductive for the subsequent application of a coating layer by electrocoating. But Applicants' invention is directed to applying a powder coating composition which does not require an electrically conductive surface. The material that Applicants apply initially improves curing and physical properties of the powder coating and are not present as in Nickerson to provide electrical conductivity to the substrate. Further, Applicants do not apply the powder coating by electrophoretic deposition as is required by Nickerson. The rejection based on Blatter and Nickerson must be withdrawn and the claims allowed.

Obviousness Rejection over Blatter et al., Nickerson, Kawada et al. and Honda et al.

Claims 5-6 were rejected under 35 U.S.C. 103 (a) as being unpatentable over Blatter et al., supra, further in view of Nickerson, supra, and further in view of Kawada et al. (US 5,663,865) and Honda et al. (US 6,800,374). Claim 5 has been canceled and any discussion concerning that claim is mute. Claim 6 has been amended and is dependent on Claim 1 and specifies the thickness of the covering coating layer applied in the first step of Applicants' claimed process.

Kawada is totally irrelevant art since it is directed to forming ceramic heaters and not to the application of powder coatings. Kawada deposits a graphite layer by pyrolysis of methane at a temperature of 1900 to 2200°C to form a resistance heater element (see Kawada, col. 4, lines 45-53). Using such temperatures would disintegrate a typical plastic substrate and deform many metal substrates and certainly could not be used in Applicants' claimed process. Applicants are not forming electrodes for heaters but applying a layer of material that improves the

physical properties powder coating that is subsequently applied at substantially shorter curing times using NIR radiation which is totally different from anything that is taught by Kawada.

Similarly, Honda is totally irrelevant to Applicants' invention since Honda is directed to forming a cleaning tape and has no relation to the application of a powder coating composition which is Applicants claimed invention. Honda simply shows adjusting the thickness of a carbon layer forming a conductive film. Honda is not directed to a process for applying a powder coating to a substrate that has been coated with a material as set forth in the amended claims that improves the physical properties of the powder coating layer and reduces the curing time using NIR radiation.

The obviousness rejection based on Blatter, Nickerson, Kawada and Honda needs to be withdrawn and the claims allowed.

Summary

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. In order to expedite disposition of this case, the Examiner is invited to contact Applicants' representative at the telephone number below to resolve any remaining issues. If there are any fees due, please charge them to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company).

Respectfully submitted,

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Date: April 19, 2007

Heraeus

Infralight IR heaters

Infralight stands for halogen infrared heaters with a spectrum in the near-infrared region, a maximum power output of 1 MW per square meter and very fast response times. They are made with high-quality quartz, usually in round tubes. On request a gold reflectors can nearly double the effective radiation onto the product.

Heraeus Infralight NIR heaters are also available as complete IR systems.

Contact Heraeus for more information on this heater type.

Technical data:

Power [Watt]	Rating [Voltage]	Heated Length [mm]	Emitter Configuration Total Length [mm]					Type No.
			L	R7s	X	U	Y	
500	235	165	227	216	236	227	222	4513 1481
1000	235	272	355	344	365	355	348	4513 1731
1000	240	254	350	340	360	350	346	4513 1732
1600	240	406	503	493	513	503	499	4513 1738
2000	235	280	355	344	370	355	348	4513 1740
2000	235	410	498	488	508	498	494	4513 1742
2500	480	635	731	721	741	732	727	4513 1745
3000	400	700	788	778	798	788	784	4513 1746
3650	480	965	1062	1052	1072	1062	1058	4513 1749

Further information:

Product information Infralight NIR heaters (PDF 1.1 MB)

Product information Round Tube emitters (PDF 0.3 MB)